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reliable a study of Norse mythology possesses, the book, it seems to us, will prove of lasting value to the student of comparative mythology. If the Norsemen originally came from Asia, we have in this recent folk lore a descendant of a fossil mythology, and a means of comparison with the mythology of our American aborigines. When the time comes for a comparative study of our Indian traditions and legends, we may be able to discover some connection with the archaic myths of the Indians of the Old World which will throw some light on the origin of human life on our continent.

Recent Books and Pamphlets. — A Romance of Perfume Lands, or the Search for Capt. Jacob Cole. With Interesting Facts about Perfumes and Articles used in the Toilet. By F. S. Clifford. Boston: Clifford. 1875. 12mo, pp. 295.

On the Superficial Geology of the Central Region of North America. By G. M. Dawson. (From the Quarterly Journal of the Geological Society, London, November, 1875.) 8vo, pp. 603–623.

La Maturation de l'Œuf, la Fécondation, et les premières Phases du Développement embryonnaire des Mammifères, d'apres des Recherches faites chez le Lapin. Communication préliminaire. Par Édouard Van Beneden. Bruxelles. 1875. 8vo, pp. 53.

The Present Condition of the Earth's Interior. By Geo. F. Kittredge. Buffalo. 1876. 8vo, pp. 16.

First Annual Report of the Chicago Botanical Garden, December 1, 1875. Chicago. 1876. 8vo, pp. 4.

GENERAL NOTES.

BOTANY.[1]

The Plantain indigenous in Southern Colorado. — While with Holmes's division of Hayden's survey last summer, in Southwestern Colorado, I found the common dooryard plantain under such circumstances as to render it probable that it is indigenous there. With the exception of a few plants growing in a grass-plot where it was no doubt sown with eastern grass seed, I have never met with it in Eastern Colorado. Near the corner of the four Territories, on the sand-bars of the Rio Dolores and Rio de los Mancos, a part of Colorado inhabited only by Navajoes and Utes, it is quite common. This almost unknown region has rarely been visited by the white man, and the plant could not have been introduced by him. — T. S. Brandegee.

Vitality of Seeds. — Professor Ernst, of Caracas, contributes the following facts to this vexed subject. The Plaza Bolivar in Caracas was formerly a market-place, and until the year 1867 formed a square plain inclined from north to south. When the government decided to remove the market and use the grounds as a park, the place was leveled by digging away about six feet of the soil at the northern end. Of course a fresh surface was thus exposed to the air. A large number of rubbish plants or very coarse weeds soon clothed the earth from which the six feet of soil had been taken. But among the many plants which came up at the northern end of the plaza was a vast quantity of *Broteroa trinervata*, a species which is very restricted in its range near the city. The only locality from which the fruits of this plant could have been brought by the wind was south of the plaza; but on account of the surroundings of the city, south and north winds are unknown. It seems likely to Professor Ernst that the seeds had remained under the cement of the old market-place for more than thirty years, and had been there preserved unharmed. When the cement was broken up and the ground graded for the plaza, the buried seeds, or rather fruits, were exposed to atmospheric influences, to moisture, warmth, and air, and after the lapse of so long a time germinated.

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[1] Conducted by Prof. G. L. Goodale.

The second case relates to a very common weed, shepherd's-purse, which, strange to say, is so rare at Caracas that it had not been met with in botanical excursions covering a period of twelve years. Two years ago, in the southern part of the garden of the monastery a place was graded for the erection of a building. A great deal of soil was removed and a wholly fresh surface was thus uncovered. Upon this spot many weeds sprang up, and among them thousands of specimens of *Capsella bursa-pastoris*, or shepherd's-purse. Professor Ernst concludes that in this case, as in the other, the seeds had remained dormant in the soil for an unknown period. These cases belong to the same class as those mentioned by Hoffmann, and given in the January number of the NATURALIST.

TROPICAL TREES DURING THE DRY SEASON. — Professor Ernst, of Caracas, states that many woody plants of the Venezuela flora lose all their leaves during the dry season, even when the ground is copiously watered for the purpose of preventing their fall. Several large-leaved plants, such as *Cassia*, mahogany, and many others, exhibit this phenomenon. The new foliage starts usually when the rainy season sets in, but if the rains come very late, as they did in 1875, many of these trees unfold their buds and develop the leaves at a period when the ground is dry and hard, the tropical heat very intense, and the air extraordinarily dry. This curious periodicity has been casually noticed by several writers, but no explanation has been hitherto offered. Professor Ernst has given this subject careful study, and now states that in general, those trees which cast their foliage in the dry season have compound leaves of rather delicate texture. From such leaves transpiration is exceedingly rapid, and early carries away all the available water. When there is no more moisture within reach of the plant, the leaves separate from the stem. In this wholly or partially leafless condition the trees remain until the end of April or the beginning of May, when the moist winds from the northwest, as precursors of the tropical rains, awake the slumbering vegetation. Of course the trees cannot absorb by their parts above ground any great amount of moisture, if they do any at all, but the slight transpiration which had been going on from stems and young shoots is now checked. The small amount of moisture which the roots can take from the parched soil is not without speedy effect upon the branches and buds to which it is carried. The buds soon open. But in the spring of 1875, when there was not a cloud to be seen in May, and the west wind at evening brought little relief from the scorching drought of the day, and the baked crust of the soil everywhere showed no trace of moisture, the trees put forth their leaves as usual! Now the first case is easily explained; how about this one, which seems so different?

At the outset, Professor Ernst admits that the individual nature of the plant, the age, the condition as regards health, etc., must be carefully investigated. This he has not yet done. He goes on, however, to say that it is generally understood that the only external excitant to growth is the warmth of the air. Since in the dry season there is, as he states, a difference between the temperature in the sunlight and at night of about twenty-seven degrees Fahr., this must cause very great changes in the volume of the gases held in the spongy tissues of the tropical trees. The pressure is very variable, and he assumes that the fluctuations must cause motions of nutrient liquid. He further assumes that when these juices are brought to the terminal cells of a bud, growth must result, and the leaves must unfold. It must be confessed that Professor Ernst has made a fair use of Krutzsch's observations in regard to the temperature of stems and twigs as affected by the surrounding temperature, and he appears to have skillfully applied the mechanical theory to this case, but he has not as yet done much to solve the riddle of periodicity of vegetable rest.

ECCENTRICITY OF THE PITH OF RHUS TOXICODENDRON. — My attention was drawn to this subject by the January NATURALIST. As is well known, this handsome but much-dreaded climber, so common in all our woodlands, has the habit of adhering tightly to the trees which it ascends by a multitude of aerial rootlets, which often cover its stem and give it the appearance of being embedded in a cushion of moss.

The results of my investigations on the stems of this plant are somewhat curious. The fact itself that the pith, wherever the vine is found adhering closely to living trees, lies very near the outer side, leaving a largely disproportionate amount of the woody tissue on the side next the tree, is, so far as I have observed, universal. The following observations will give an idea of this disproportion: —

In a vine 5½ lines in diameter the distance from the centre of the pith to the inner margin was 4¾″, and to the outer only ¾″. This proportion held uniformly for various heights from the ground. The measurements included the bark, which, as well as the annual rings, partook of the general tendency, and was much thinner on the outer side.

A larger vine, upwards of an inch in diameter at the base, had climbed a cedar-tree (*Juniperus Virginiana* L.) to the top, and, no longer finding anything to adhere to, sent out free fruiting branches nearly half an inch thick. Of this I took several measurements. Two and a half feet from the ground, where the diameter was $10\frac{1}{2}''$, the distance from centre of pith to inner edge was $8\frac{1}{2}''$, and to outer $2''$. A foot lower the proportion had decreased to that of $9''$ to $2\frac{1}{2}''$ in a diameter of $11\frac{1}{2}''$. Ten inches lower still it had further decreased, so that the pith was still $9''$ from the inner, but $4\frac{1}{2}''$ from the outer margin. The ratios between the two distances in descending the stem were therefore, respectively, $4\frac{1}{4}$, $3\frac{3}{5}$, and 2. Above the first-mentioned point the position of the pith remained nearly unchanged.

A very large vine, nearly four inches in diameter, gave less marked results. Sections not being exactly circular, linear measurements could not be relied upon, but a line drawn through the heart, parallel to a tangent at the point of contact with the tree to which it adhered, showed a decided preponderance of wood in the inner segment. The adhesion in this case, however, as is probably the case with all large vines, was slight, the rootlets appearing to lose their vitality with age. The vine divided at the height of eight feet, and the branches, which adhered more closely, showed a greater eccentricity.

Numerous observations were made on other vines thus normally situated, with substantially the same results. One case in particular, however, exhibited the extreme of the phenomenon, the cellular dot approaching to within a fourth of a line of the membranous bark. Indeed, so anxious did it seem to remove itself to the greatest possible distance from the tree that for the greater part of the way there was a manifest ridge running along the back of the stem, in which the pith was situated.

These facts, however, uniform and singular as they are, could not in themselves be regarded as sufficient to demonstrate the absorption of sap from the supporting trees by the rootlets. To satisfy such an assumption certain tests must be applied. The first that suggested itself to me was that of making similar observations at points where, for any reason, the vines had swung loose from their support, so that no connection should exist by means of the rootlets. Many such cases were found and examined. The larger vine first referred to, which at a distance of two feet and a half from the ground, where the attachment was firm, measured $8\frac{1}{2}''$ to the inner and $2''$ to the outer margin, giving a ratio of $4\frac{1}{4}$ between the measurements, had the pith located $5\frac{1}{4}''$ from the inner and $3\frac{3}{4}''$ from the outer margin, a ratio of $1\frac{2}{5}$, at a point some six feet higher, where it had become detached. In this example it was evident that there had formerly existed some degree of attachment. At other points higher up, where there were less signs of its having ever adhered, the pith was found to be nearly central, while on the projecting branches of the same vine, bearing the berries and showing no tendency to cling, there was no appreciable eccentricity. Another small vine, which adhered for four feet and then swung away for two feet, reattaching above, had the pith decidedly more central at the detached part than at points either above or below. The extreme case to which I referred, where the pith actually ran through a tube slightly raised above the outer surface, showed a transition from this state of extreme eccentricity to one of centrality in the space of one foot where the vine suddenly abandoned its support.

The function assigned to the rootlets by the hypothesis is one of parasitism. They are assumed to penetrate the bark as far as the cambium layer, and remove the sap of the tree, appropriating it directly to the vine. This nutrition, being ready-made, would naturally be deposited at the nearest point of contact, and thus account for the great preponderance of woody tissue found on the side next the tree. It would therefore follow that this eccentricity of pith should not exist where the support is not a living tree. To test this question, I sought out a small vine of the same species which climbed and closely adhered with a profusion of rootlets to a perfectly dry stone wall ten feet in height. This I examined most carefully, and accurately measured at various points, finding the position of the pith uniform at all distances from the ground. The following measurement will therefore answer for all: Three feet from the base, where the diameter was $4\frac{3}{4}''$, the pith was $2\frac{3}{4}''$ from the inner and $2''$ from the outer edge, or within three fourths of a line of the centre.

One other class of instances seemed to bear directly on this point, and to these I gave special attention. I refer to vines found climbing fences and posts under varying circumstances. The results obtained from these were perhaps the most surprising of all. One $5\frac{1}{4}''$ in diameter tightly hugged a decayed fence post, insinuating its rootlets deeply into the soft surface. Of this the pith was $4''$ from the inner and $1\frac{1}{4}''$ from the outer margin, giving the astonishingly large ratio of $3\frac{1}{5}$. A section of a larger stem ($11''$) similarly situated, and whose rootlets tore away considerable of the decayed wood in detaching it, showed the centre of the pith to be $7''$ from the inner and $4''$ from the outer margin. Considering the size of this vine the eccentricity was large.

Where the wood to which the vines adhered was not decayed or soft, a marked diminution in the eccentricity was perceptible. In one instance where the rootlets clung very tightly to a dry surface, which had moreover been charred and where penetration was impossible, the measurements were respectively $3\frac{1}{2}''$ and $2\frac{1}{2}''$, or an eccentricity of half a line in a diameter of half an inch.

So far as my observations, which were numerous, extended, it seemed to be the law that, *cæteris paribus*, the softer the wood to which the rootlets adhered, the greater the eccentricity of the pith.

Without going further into details, therefore, the whole subject may be thus briefly summed up: —

(1.) The pith of the poison ivy, wherever the vine is of moderate size, and is found adhering closely either to the bark of a living tree or to any soft, decaying substance, is located from three to ten times nearer the outer than the inner side of the stem, and sometimes still more eccentrically; the annual layers of wood as well as the bark becoming correspondingly thickened on the side next the support.

(2.) This eccentricity diminishes and frequently disappears altogether at points where there is no attachment by the rootlets.

(3.) It is greatly reduced in vines which cling to hard substances which the rootlets are unable to penetrate, as a stone wall or a dry post.

That all these facts are in harmony with the theory of the absorption of nourishment from the support, in so far as any form of parasitism is implied, cannot of course be maintained. The last class of observations described may be regarded as directly negativing such an assumption. Besides, I have seen nothing to render it probable that the rootlets ever pierce the outer bark. But, on the other hand, these facts do all unite in pointing to a physical connection of some kind between the penetration of the rootlets and the eccentricity of the pith. The notion thus far entertained, and which has found its way into our standard text-books, that these rootlets are "not for absorbing nourishment, but for climbing,"[1] may in future require some modification. Yet, admitting this physical connection, there remain puzzling physiological questions. If these rootlets perform the function of true roots, and find congenial soil in the corky layer of bark, in the soft mass of decomposed wood, and even to some extent in the minute cryptogamic vegetation that always exists among them even when clinging to walls of brick or stone, how does this explain the singular behavior of the pith and the strange eccentricity of the annual rings? — LESTER F. WARD.

SETS of Dr. Edward Palmer's recent collection of plants of San Diego Co., California, and of the Tantillas Mountains in Lower California, near the boundary, will shortly be ready for distribution. They will probably number about three hundred species, and will be sold at ten dollars per hundred. Address Sereno Watson, Cambridge, Mass.

ROBINIA HISPIDA. — Can any of our readers procure specimens of *the fruit* of this plant for Professor Gray, of Harvard University, Cambridge? The pods are almost unknown.

BOTANICAL PAPERS IN RECENT PERIODICALS. — *The Journal of Botany* (Trimen), February. S. Kurz, On the Species of *Glycosmis* (plants of the orange tribe). A. E. Eaton, Plants of Spitzbergen. H. F. Hance, New Orchids from Hong Kong. Reichenbach fils, Descriptions of three Plants. W. B. Helmsley, Notes on the Flora of Sussex. R. A. Prior, On *Rumex hydrolapathum* and *R. maximus*. G. Dickie, On Marine Algæ from Kerguelen Island. M. J. Berkeley, On a New Agaricus from Kerguelen Island. Dr. Gray's paper on Æstivation and its Terminology is reprinted in this number.

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[1] Gray's Lessons, page 34.

Comptes rendus, January 3d. Duchartre, Conclusions respecting the Production of Saccharine Matters in Plants. E. Heckel, Floral Glands of *Parnassia palustri.* January 10th. R. Corenwinder, On the Diminution in the Amount of Sugar in Beets, during the Second Period of their Growth.

Annales des Sciences naturelles, December, 1875. P. Duchartre, On the Bulbs of *Lilium.*

Flora, No. 33. Dr. Lad. Celakovsky, On Intercalated Epipetalous Stamens. F. Arnold, On the Lichens of the French Jura. Nos. 34 and 35. C. Müller, New Grenada Mosses. Dr. K. Prantl, Morphological Studies. No. 36. O. Böckeler, On certain Carices. This number contains a very long and interesting review of Darwin's Insectivorous Plants. No. 1. Hugo de Vries, On the Wood formed during Repair of Wounds in Trees.

Botanische Zeitung, No. 2. On the Palmella State of *Stygloclonium*, by L. Cienkowski. On the Influence of Light on the Color of Flowers, by E. Askenasy (elsewhere noticed). No. 3. Botanical Miscellany, by Dr. A. Ernst (abstracts of these notes are given above). On the Behavior of Yeast in Liquids free from Oxygen Gas, by M. Traube (controverting the views of Brefeld). No. 4. The Development of *Basidiomycetes*, by Oscar Brefeld. (A review of some recent publications, especially those of Reess and Van Tieghem.) No. 5. Investigations respecting Growth, by J. Reinke (not finished). On the Rate of Movement of Water in Plants, by Dr. Pfitzer (to be hereafter noticed). In the report of the Bonn society, Professor Pfeffer's papers on the Formation of the Primordial Utricle, and the Production of High Hydrostatic Pressure by Osmosis, previously noticed in this journal, are given with considerable fullness. No. 6. On the Morphology of the Araceæ, by Dr. A. Engler (not finished).

ARBEITEN DES BOTANISCHEN INSTITUTS IN WÜRZBURG, herausgegeben von Professor Dr. Sachs. Erster Band. This volume of contributions from the Botanical Institute at Würzburg comprises four parts, which have appeared at nearly regular intervals since 1871. The work can therefore be ranked among periodicals. In the present notice we shall give very briefly a sketch of the memoirs, hoping to present fuller outlines of several of them in subsequent numbers of the NATURALIST. 1. Dr. W. Pfeffer, On the Action of Colored Light on the Decomposition of Carbonic Acid in Plants. (By an improved method of research the following results were reached: Only the visible rays of the spectrum can decompose carbonic acid; in fact, those which seem brightest, namely, the yellow rays, are alone as efficient in this work as all the others combined. The most highly refrangible rays of the visible spectrum, and those which act most energetically on chloride of silver, etc., play a subordinate part in assimilation. Each color in the spectrum has a definite quantitative effect on the activity of assimilation.) 2. Dr. W.

Pfeffer, Studies respecting Symmetry and Specific Causes of Growth. (An examination of the influence of surroundings upon the growth of a liverwort.) 3. J. Sachs, On the Influence of the Temperature of the Air and the Effect of Daylight on the Periodical Changes in the Rate of Growth of Internodes in Length. (See abstract in Sachs' Text-Book, page 735 *et seq.* In the memoir, Professor Sachs has given a very full *résumé* of the literature of the subject.) 4. J. Sachs, On Negative Geotropism. (Observations respecting the curving upwards of shoots from a stem placed horizontally.) 5. J. Sachs, On the Deflection of Roots from their Normal Direction of Growth by Contact with Moist Surfaces. (See abstract in Sachs' Text-Book, page 764.) 6. Hugo de Vries, On some Causes of the Direction taken by Parts or Plants which possess Bilateral Symmetry. (The effects of gravitation, light, defoliation, etc., are examined. The views of Frank are contested. See Text-Book, page 705.) 7. J. Sachs, The Plant and the Eye as Different Tests for Light. (Sachs had early insisted upon a distinction between objective intensity of light and its brightness to the eye. Prillieux in a paper on the subject is thought to have overlooked these distinctions, as well as that between refrangibility (objective) and color (subjective). In the present memoir Professor Sachs reviews the literature of the subject, defends his former position, and further explains the relation between the intensity of light and the activity of assimilation.)

ZOÖLOGY.

THE CROSSBILL BREEDING AT RIVERDALE, N. Y. — This bird (*Loxia curvirostra* var. *Americana*) made its appearance here last autumn, November 3d. Small flocks were occasionally seen all winter, and through March and April, feeding on seeds of cones of the Norway spruce and larch. On April 22d I noticed a pair building near the top of a red cedar, about eighteen feet from the ground. The nest, April 30th, contained three eggs, and was composed of strips of cedar bark, dried grass, and stems of the Norway spruce, and was lined with horse-hair, feathers, dried grass, and fibrous roots. The eggs were about the size of those of *Junco hyemalis*, in color very light blue, slightly sprinkled and blotched at the large end with dark purple. I saw a small flock of six of these birds May 10th, which were the last seen here. Riverdale is on the Hudson River, sixteen miles north of New York Bay. — E. A. BICKNELL.

BEWICK'S WREN (*Thryothorus Bewicki*), although not a well-known bird to those not ornithologists, is not "something of a rarity" in the middle Atlantic States, as stated by Dr. Coues in the January number of the NATURALIST. I have not failed to find considerable numbers of them for several years past. They appear to have a strong attachment for certain localities, and, if undisturbed, will return year after year to